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Identifying the Challenges of Prehospital and Hospital Emergency Services During the Management of Alcohol Poisoning Disaster in the City of Rafsanjan

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Abstract

Objective:
Methanol poisoning can lead to the loss of vision and even death. The role of the health care system in managing and responding to these types of incidents is significant. This study aimed to identify and discuss the challenges of prehospital and hospital emergency services responding to the widespread methanol poisoning in the city of Rafsanjan.

Methods:
This qualitative study was carried out using content analysis approach. Data were collected using semi-structured interviews. Participants included the matrons of health centers, head of accident and medical emergency center, director of the emergency operation center, ward manager and nursing staffs, and the representative of university's board of directors. After 15 interviews, data saturation was reached.

Results:
The findings of this study are based on 4 stages of disaster management cycle, which include: (1) mitigation in disaster with 2 subscales, (2) preparedness with 2 subscales, (3) response to disaster with 4 subscales, and (4) rehabilitation with 3 subscales.

Conclusions:
Interinstitutional coordination should be promoted through joint meetings, and also training classes on disaster management and its implementation should be held. Moreover, up-to-date clinical protocols must be accessible to personnel, and facilities and resources needed in the disaster should be provided.

Key Words: emergency, alcohol poisoning, mass casualty, disaster, Ems

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Disaster management provides a management framework for preventative measures, reducing harmful effects and utilizing the facilities available to prepare for crises.[1] A disaster is the result of a combination of the risks, vulnerabilities and capacities of a community to reduce its negative outcomes, and disaster management with a systematic approach, provides managerial decision makings, implementation of operational skills, and capacity building for the establishment of appropriate policies and strategies to moderate and control the conditions of the disaster.[2,3]

Prehospital and hospital emergency services are considered valuable sources for responding to a disaster, and the readiness of these effective institutions to overcome the disastrous consequences of the disaster is essential.[4,5] The readiness of prehospital emergency services is considered by emergency operation center (EOC) as an essential tool in the rapid assessment of the disaster and initial information gathering from accidents.[6] Disaster management can play its role only if it is able to manage the disaster at the scene from the beginning, and prevent unnecessary transportation of the injured.[7] In normal situations, the communication between hospitals and prehospital emergency services (emergency center 115) is a common theme; however, in times of disaster, because of the need for highly intensive and fast prehospital and

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hospital emergency services, this communication needs to be organized and managed.[8] Therefore, the managers of hospital and prehospital emergency services should facilitate coordination between these 2 services. Because the lack of plan and organization to deal with accidents and the unpreparedness of hospitals and prehospital emergency systems in confronting various crises can have irreversible consequences for patients as well as country's health care system.[9,10]

To achieve this, effective communication between hospitals and prehospital emergency systems is essential.[11] The emergency delivery system, as a critical care provider, has interconnected components that generally consist of 2 parts: the prehospital service provider including the transfer of patient and the hospital emergency service provider.[12,13]

Poisoning with alcoholic beverages containing methanol is considered as one of the medical emergencies.[14] Methanol is a highly toxic alcoholic substance. Symptoms of methanol poisoning usually appear within 30 minutes to 4 hours after consumption, which includes nausea, abdominal pain, headache, dizziness, sleepiness, and weakening of the central nervous system.[15,16] Usually, patients do not visit the physician at this stage. After that, there is a latent period that depends on the dose of methanol consumed, which lasts approximately 6 to 24 hours. Subsequently, metabolic acidosis is not compensated and that causes visual impairment that occurs in the range of blurred vision, visual field changes, photophobia, impaired eye accommodation, dual vision and then complete blindness, and rarely nystagmus.[15,17] According to US' statistics in 1996, 2589 people were poisoned by methanol.[16] Most mass methanol poisoning events occur in developing countries or countries where alcohol consumption is forbidden.[18] In a study that looked at the deaths caused by drug use in Iran, the results showed that 25% of the deaths were caused by methanol and ethanol consumption.[19]

In June 2012 in Rafsanjan, in 60-hour time interval (from the first patient's visit to the hospital to the end of acute phase and 2 waves of patient referral), >700 patients were transferred to the emergency department of Ali-ibn-Abitaleb Hospital in Rafsanjan and nearly 50 patients directly attended the health centers of nearby cities with mild to severe symptoms of methanol poisoning. Eventually, at the end of the third day, 9 of them died, 2 were permanently blind, and fortunately, others did not suffer seriously, although their chronic complications have not been investigated yet.

According to the definition, the occurrence of >3 methanol poisonings in a region over a period of 24 hours suggests an epidemic,[20] and the most common cause of methanol poisoning in Iran is the consumption of methanol contaminated alcoholic beverages, which has irreversible consequences for the individual and society.[21] Since hospitals are one of the most important centers in the disaster situations and the lack of concrete plan and organization to deal with accidents, as well as unpreparedness of the hospital and prehospital emergency systems in coping with the disaster can have irreversible consequences for the individual, society and country's health care system, this study was conducted to assess the performance of hospital and prehospital emergency services during the methanol poisoning disaster in Rafsanjan. In contrast, the information obtained from this study can be used as a strategy by the managers of health care and medical emergency services in similar situations.

METHODS

This qualitative study was conducted using content analysis approach. In this study, information from 15 semistructured interviews conducted on managers who were involved in the alcohol poisoning disaster and had close contact with the problem was collected. The interviewees included the matrons of health centers, head of accident and medical emergency center, director of emergency operation center (EOC), ward manager and nursing staffs, and the representative of university's board of directors. Sampling continued until data saturation, which was reached after 15 interviews.[22] Before the interviews, required coordination was made regarding interview time. The interviews lasted

ADDICTIVE DISORDERS & THEIR TREATMENT
Volume 00, Number 00
■■ *2019*

between 60 and 90 minutes. The data obtained from interviews were analyzed using content analysis method.[23] The interview guide contained questions about various topics, including how did they find out about the disaster, the initial steps that were taken by them on the basis of their duties, the progress of the alcohol poisoning disaster, the peak hours of alcohol poisoning admission, planning and organization of working shifts, recruited personnel and volunteers, treatment of patients and patients' companions, handling of personnel and volunteers, management of the disaster at different levels, the level of familiarity of the members of hospital disaster management center with their duties, the performance of logistic management, handling of patients and personnel after the disaster, and inter-organizational coordination. To determine the accuracy and reliability of the findings and to increase the validity, a constant engagement with the subject and research data was maintained. The professors and experts' opinions on the process of conducting interviews, their analysis, and extracted data were used. The texts of the interviews, extracted codes, and subscales were discussed with the participants and their comments were applied. An external observer was also used to examine the data that approved the study process and findings.[24]

RESULTS

After analyzing the interviews, the findings were determined and identified in 4 stages of disaster management cycle. At each stage of the disaster management cycle, the data were classified into different categories. The categories included: (1) mitigation against disaster with 2 subcategories, (2) preparation with 2 subcategories, (3) response with 4 subcategories, and (4) rehabilitation with 3 subcategories. Below are the findings of the study on the disaster management cycle that is being discussed.

Mitigation

The weaknesses and strengths of the response to the alcohol poisoning disaster in the phase of reducing the impacts of the disaster were identified during the predisaster and disaster periods.

Predisaster Period

In the predisaster phase, the interviewees stated that there was no preparation in the structural and nonstructural discussion. For example, one of the participants stated: "There was an urgent need for dialysis, but the distance between emergency department and dialysis center was too far and that problem was hindering the treatment process" (P: 11). In this regard, another interviewee stated: "The capacity of hospital's dialysis center was much less than what was needed" (P: 7). "If the emergency room is constructed for disaster times so that it can be used for the triage and residence of outpatients or patient companions, it would be very effective" (P:14). Another interviewee in regard to the design of the emergency department stated: "… In terms of diagnostic tests, there was a need for the emergency laboratory to be available" (P: 12, P: 15).

During the Disaster

The interviewees stated that a rapid warning to inform people about the cause of poisoning and to raise awareness about the symptoms by announcing through radio and text alert system was one of the strengths of the alcohol poisoning disaster response management. In this regard, one of the interviewees stated: "There were some problems with the warning system (some organizations' opposition), we decided to put a warning out on the radio and by text message saying that, a stuck of alcohol beverages has caused many methanol poisoning, and luckily, the warning was announced by the radio around 14:00 on Thursday." (P: 1)

Preparedness

In the present study, in regard to the preparation, 2 subcategories of failure to predict the necessary facilities and equipment in the disaster and the lack of plan for organizing auxiliary and volunteer forces were identified, which are explained in this section.

Failure to Predict the Necessary Facilities and Equipment in the Disaster

Preparation leads to correct response that minimizes the damage.

The interviewees in this regard stated: "There predictions must be done prior to the disaster. It is always discussed, but no action is ever taken. At the holidays and disasters, the pharmaceutical system should be ready to the point where the needs and deficiencies are resolved" (P: 8). In this regard, another interviewee stated: "From my point of view, the weakness was the lack of vital medical equipment, such as ventilator, blood gas device, and dialysis machine" (P: 9). Another participant referred to the shortages of human resources at the prehospital system: "At that time, the frequency of 115 calls by regular patients was reduced, but unfortunately, as the ambulances were quite old and there was a shortage of human resources, we could not use our full capacity."

Lack of Plan for Organizing Auxiliary and Volunteer Forces

The results showed that the capacity of volunteers was not used fully during the response to methanol poisoning in Rafsanjan because of the lack of organization and planning. In this regard, one of the interviewees stated: "Another problem we had was that in any disaster the volunteers want to help and in this disaster, the first term students of the laboratory, medicine, etc.… wanted to help, and this practice led to the waste of medications, etc, and they turned the disaster into practice time. There was the same number of volunteers as patients, and the atmosphere was crowded and uncontrollable "(P: 1). In this regard, another interviewee stated: "Although the disaster headquarters had been formed and was coordinating the auxiliary forces, the congestion of auxiliary forces was getting on the way more than helping" (P: 7).

Emergency Response and Response to Disaster

Response is a phase in which the incident response program is actually activated that aims to maintain human lives, provide first aid, reduce and repair damages to existing systems, and provide services to the victims. In the present study, we were able to identify several codes, including communication, lack of a disaster response plan, lack of facilities and resources, and lack of organization to manage the volunteers, which will be explained in detail as follow:

Communication

The interviewees referred to the lack of planned communications and real information as the management weaknesses in responding to this disaster. In this regard, the interviewees stated that: "At that time, we did not have a memorandum of understanding with the other organizations, so they only gave us few servicemen, but at that time this number was not enough" (M: 6).

Lack of Disaster Response Plan

The interviewees talked about the weaknesses in the planning at the response phase. An interviewee, for example, referred to the lack of a triage program in disaster and said: "After the message was sent, a large number of people, nearly two to three thousand people, attended the emergency room, which in addition to congestion, created another problem, such as a conflict in emergency room. Naturally, everybody wanted to enter the emergency room "(P: 1). Another interviewee talked about the lack of planning for personnel's entry in and out of hospital environment: "The people were not being signed in anywhere and it was not clear how many hours they have worked" (P: 2). An interviewee referred to the lack of attention to the fatigue, stress, and nutrition of the personnel involved in the disaster and stated: "The staffs who were working hard and became tired did not have a place to rest and have something to eat. There was not even a glass of water to drink, but the staff needed rest and nutrition" (P: 12). Another finding of this study, which was also mentioned by most of the interviewees was "the lack of managers and personnel's awareness about the description of their duties in disaster" (P: 1, P: 2, P: 3, P: 4, P: 5).

Lack of Facilities and Resources

According to the interviewees, the shortages included; lack of sufficient workforce in the prehospital service,

ADDICTIVE DISORDERS & THEIR TREATMENT
Volume 00, Number 00
■■ *2019*

lack of planning for the use of facilities available in the area, and lack of some hospital equipment. One of the interviewees in this regard stated: "The ambulances used belonged to the organizations that were not affiliated with the university, and their quantity was not enough and did not have required equipment. There was no planning to use the capacity of the partner organizations and support program" (P: 1). Another interviewee in regard to appropriate response to the disaster stated: "Equipping the disaster warehouse and preparing the necessary equipment and resources at any given time, and taking into account the medical facilities and equipment needed by patients, are among essential factors that need to be followed up" (P: 7). Other interviewees stated: "The ABG device of the laboratory was not responding so we used the ABG device of the cardiac operating room, which had its own problems." (P: 5, P: 12, P: 9)

Lack of Organization to Manage the Volunteers

Many interviewees talked about the lack of organization to manage the volunteers. For example, one of the interviewees stated: "Personnel who came for help were not familiar with the emergency room" (P: 12). Another interviewee in this regard stated: "Lack of organization to manage the employees who had come to help with their personal clothes was sometimes disrupting the services" (P: 9).

Rehabilitation and Recovery

This part of the disaster management cycle includes all the operations and actions that are taken to normalize the situation, including the resumption of vital services and reconstruction. This code explained the rehabilitation in the disaster and how to assess damages and conditions. The interviewees believed that, to some extent, the assessments were not accurate and there were deficits and shortcomings. One interviewee said: "In the rehabilitation and recovery phase no action was taken, and the people involved were left alone although the people themselves did not want to be followed up. So a year on, there is still no statistics available to show how many of the patients had complications. Unfortunately, nothing was done in the recovery phase" (P: 1). In regard to the handling of personnel in the postdisaster phase, which usually occurs during the recovery phase, one of the interviewees stated: "There were friends who were very effective, but at the end, they did not even get any recognition" (p: 14).

DISCUSSION

As shown in the results, 4 stages of disaster management cycle during the alcohol poisoning disaster that occurred in June 2012 in Rafsanjan, were investigated in relation to the prehospital service and emergency department services at the hospital. The reduction of impacts is the first stage of disaster management cycle. The results of interviews with people involved in the methanol poisoning disaster showed that, the performance of the prehospital system and hospital emergency system of Rafsanjan University of Medical Sciences was not adequate during the predisaster phase and had many problems such as; inappropriate physical space of the emergency department and the inappropriate distance of the dialysis unit from the emergency room. In this regard, Ghanaee's[25] study indicated that the admissions and waiting room spaces should be large. It is necessary to provide an appropriate space for an emergency with regard to regional crises. The results showed that, in regard to the nonstructural factors, the performance of the prehospital system and hospital emergency system in Rafsanjan University of Medical Sciences was inappropriate, and lack of prediction of the required equipment needed in disaster was one of the weaknesses of disaster management. The lack of prediction of the ABG device was evident in the emergency department of the hospital. In this regard, the study of Mehrabi et al[26] showed the necessity of having a laboratory to assist the medical staff in the disaster.

In the predisaster phase, lack of a protocol for the treatment of alcohol poisoning was one of the results of this study. In previous studies, it has also been shown that most health care centers and emergency rooms do not have the

ability to eliminate contamination from injured patients and they lack a single section for this purpose. Shid[27] and in this regard, Zabihi and Abdollahi[28] considered the existence of scientific protocols for dealing with toxic and chemical substances to prevent further contamination of people and the environment, as a vital element. Khayatzadeh and Zabali[29] also found that there were very few official educational programs for medical and paramedical staffs to deal with such crises.

The present study and other studies have shown that the lack of a therapeutic protocol for poisoning leads to a delay in the treatment process. However, there are many different poisoning crises and some of the poisonings or contaminations are at the individual level. Therefore, it is necessary and essential to predict crises and develop protocols.

Preparation is the second stage of the disaster management cycle. The present study showed that the performance of the prehospital and hospital emergency systems of Rafsanjan University of Medical Sciences during the disaster of alcohol poisoning was not desirable and facilities, resources, and equipment necessary to respond to the crises with mass injuries had not been provided. In Iran, most hospitals do not have the resources to respond to crises with large casualties and are often heavily reliant on outside resources and international assistance when such crises occur.[30,31] In another study, Amiri et al[32] showed that hospitals of Babol University of Medical Sciences did not have the necessary equipment and resources to use in times of crises. In the preparation phase, the information system had not been predicted. Studying of Salari et al[33] indicated the need for the communication and information centers, as timely and accurate information, makes rescue operations more effective. Hosseinian-Moghaddam et al[34] also identified the lack of methanol poisoning surveillance system as one of the challenges of responding to the current incident and compared it with how US health care system registers such cases. It seems that for the proper management of crises, development of the health care system is essential. The present study showed that the hospital emergency and prehospital systems of Rafsanjan University of Medical Sciences had problems in the preparation phase to organize the volunteers, and also in the response phase. Therefore, in order to use volunteers in unexpected events, as shown in Ayoubian study, volunteers must have an organizational structure, good governance, plan, training promotion, and skill improvement, like any organization.

The third phase of disaster management cycle is the response phase. The response of the prehospital and hospital emergency systems of Rafsanjan University of Medical Sciences during the alcohol poisoning disaster was relatively weak based on the present study. In this regard, the lack of coordination between organizations and the lack of basic information were the factors found in this study. Communication and exchange of information between the organizations and the people are the basis and the first step in the disaster planning. Chen et al[35] showed that discrepancy between the response organizations can increase the number of casualties and mortality. Also, correct and accurate information can determine the type of response, and the lack of proper information, in many cases, delays the response to disaster. In this regard, Lacquo acknowledged that real data after an incident increases the ability of managers and planners to take final and proper management decisions.[36,37]

Rehabilitation and reconstruction is one of the four stages of disaster management cycle and includes the measures to stabilize and restore society to preincident situations. Another finding of this study was the lack of following up patients' conditions in the rehabilitation phase, as the patient follow up is significantly important in reducing the complications of alcohol poisoning. In this regard, Galya's study showed that survivor's psychotherapy is needed to reduce posttraumatic stress and prevent fear and depression.[38,39] People who deliver health and medical services, such as physicians, nurses and emergency staffs, are at risk of stress and mental harm. Therefore, special attention should be paid to the personnel involved in the disaster. In this regard, results of the present study revealed that the

ADDICTIVE DISORDERS & THEIR TREATMENT
Volume 00, Number 00
■■ *2019*

performance of the prehospital and hospital emergency systems of Rafsanjan University of Medical Sciences was not desirable. Alexander and Klein's[40] study showed that aggression, conflicts, depression, and nonadaptive behaviors in respondents are sometimes because of disaster situations that should be addressed and treated appropriately. For to the rehabilitation of poisoning victims and the prevention of subsequent complications, some meetings and gathering could be organized for victims to discuss the problems and what happened and could happen.

CONCLUSIONS

Regarding the four main stages of the disaster management cycle, it can conclude that, there was no planning and prediction regarding the prevention and mitigation of the impacts of disasters and crises, as even the alcohol treatment protocols were not available, and exchange of information did not occur adequately at the beginning of the disaster because of the interorganizational discrepancies. Regarding the preparation for the disaster, the prediction and planning, the facilities, resources, and manpower had not been well organized. Response to the disaster was also inadequate and not standard because of the poor communication, poor planning for treatment and triage, manpower fatigue and inappropriate nutrition, the large number of miscellaneous people in the hospital and some incorrect plans, and equipment shortages. Moreover, rehabilitation of the victims did not take place because of the cultural issues and lack of cooperation of the victims, and follow up of their treatment were not desirable. Therefore, in order to strengthen the response to such incidents, it is essential to provide and strengthen the system of care delivery and provide the necessary training for relevant staffs. Similarly, the response programs to these incidents need to be reviewed and revised to better address issues such as communication, human resource management and volunteering, nutrition and support, and other challenges that we face when dealing with them.

ETHICS STATEMENT

The present study was approved by Ethical Committee Medical Sciences University of Kerman. Also, after selecting the eligible participant, the researcher was introduced to them and the objectives of the study were elaborated for the participants. The informed consent was obtained from the subjects and they were assured that their information will remain confidential.

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